



# SINGLE CHANNEL IL74 DUAL CHANNEL ILD74 QUAD CHANNEL ILQ74 Phototransistor Optocoupler

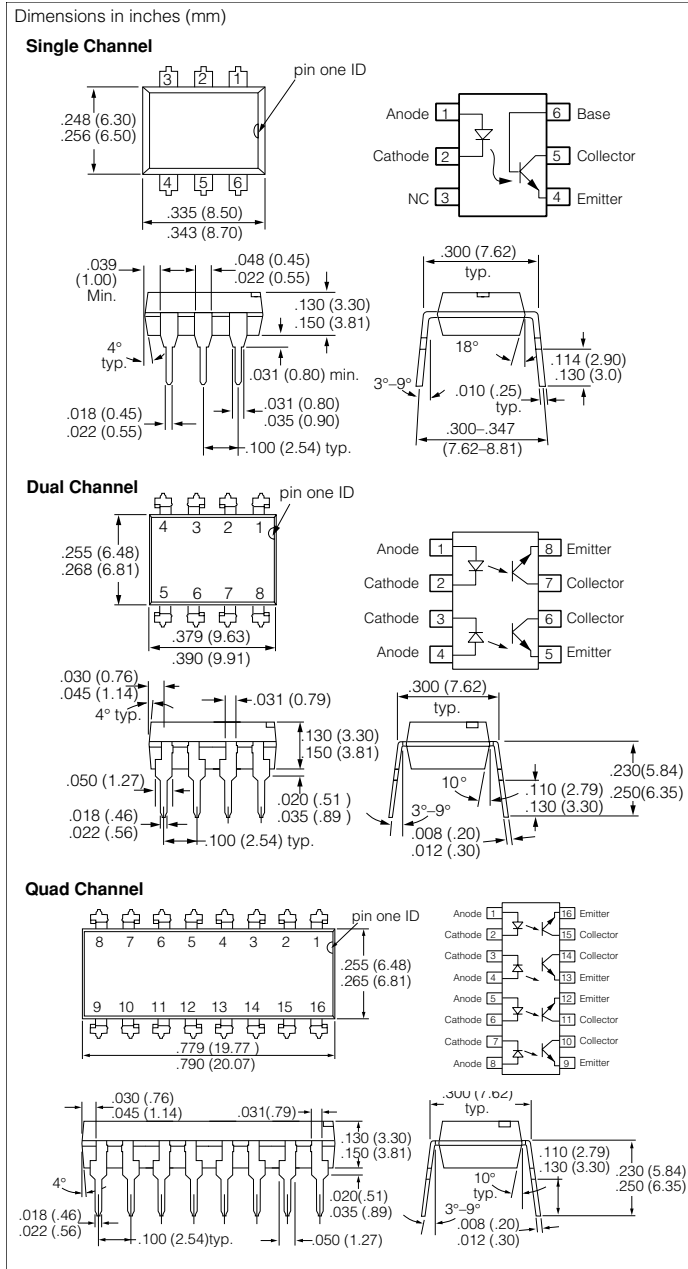
## FEATURES

- 7400 Series T<sup>2</sup>L Compatible
- Transfer Ratio, 35% Typical
- Coupling Capacitance, 0.5 pF
- Single, Dual, & Quad Channel
- Industry Standard DIP Package
- Underwriters Lab File #E52744
- VDE Approvals #0884  
(Optional with Option 1, Add -X001 Suffix)

## DESCRIPTION

The IL74 is an optically coupled pair with a Gallium Arsenide infrared LED and a silicon NPN phototransistor. Signal information, including a DC level, can be transmitted by the device while maintaining a high degree of electrical isolation between input and output. The IL74 is especially designed for driving medium-speed logic, where it may be used to eliminate troublesome ground loop and noise problems. Also it can be used to replace relays and transformers in many digital interface applications, as well as analog applications such as CRT modulation.

The ILD74 has two isolated channels in a single DIP package; the ILQ74 has four isolated channels per package.



### Maximum Ratings

#### Emitter (each channel)

Peak Reverse Voltage .....	3.0 V
Continuous Forward Current .....	60 mA
Power Dissipation at 25°C .....	100 mW
Derate Linearly from 25°C .....	1.33 mW/°C

#### Detector (each channel)

Collector-Emitter Breakdown Voltage .....	20 V
Emitter-Base Breakdown Voltage .....	5.0 V
Collector-Base Breakdown Voltage .....	70 V
Power Dissipation at 25°C .....	150 mW
Derate Linearly from 25°C .....	2.0 mW/°C

#### Package

Isolation Test Voltage (t=1.0 sec.) .....	5300 V <sub>RMS</sub>
Isolation Resistance	
V <sub>IO</sub> =500 V, T <sub>A</sub> =25°C .....	≥10 <sup>12</sup> Ω
V <sub>IO</sub> =500 V, T <sub>A</sub> =100°C .....	≥10 <sup>11</sup> Ω
Total Package Dissipation	
at 25°C Ambient (LED Plus Detector)	
IL74 .....	200 mW
ILD74 .....	400 mW
ILQ74 .....	500 mW
Derate Linearly from 25°C	
IL74 .....	2.7 mW/°C
ILD74 .....	5.33 mW/°C
ILQ74 .....	6.67 mW/°C
Creepage .....	≥7.0 mm
Clearance .....	≥7.0 mm
Storage Temperature .....	-55°C to +150°C
Operating Temperature .....	-55°C to +100°C
Lead Soldering Time at 260°C .....	10 sec.

### Electrical Characteristics T<sub>A</sub>=25°C

	Symbol	Min.	Typ.	Max.	Unit	Condition
<b>Emitter</b>						
Forward Voltage	V <sub>F</sub>	—	1.3	1.5	V	I <sub>F</sub> =20 mA
Reverse Current	I <sub>R</sub>	—	0.1	100	μA	V <sub>R</sub> =3.0 V
Capacitance	C <sub>O</sub>	—	25	—	pF	V <sub>R</sub> =0
<b>Detector</b>						
Breakdown Voltage, Collector-Emitter	BV <sub>CEO</sub>	20	50	—	V	I <sub>C</sub> =1.0 mA
Leakage Current, Collector-Emitter	I <sub>CEO</sub>	—	5.0	500	nA	V <sub>CE</sub> =5.0 V I <sub>F</sub> =0
Capacitance, Collector-Emitter	C <sub>CE</sub>	—	10.0	—	pF	V <sub>CE</sub> =0, F=1.0 MHz
<b>Package</b>						
DC Current Transfer Ratio	CTR <sub>DC</sub>	12.5	35	—	%	I <sub>F</sub> =16 mA, V <sub>CE</sub> =5.0 V
Saturation Voltage, Collector-Emitter	V <sub>CEsat</sub>	—	0.3	0.5	V	I <sub>C</sub> =2.0 mA I <sub>F</sub> =16 mA
Resistance, Input to Output	R <sub>IO</sub>	—	100	—	GΩ	—
Capacitance, Input to Output	C <sub>IO</sub>	—	0.5	—	pF	—
Switching Times	t <sub>ON</sub> , t <sub>OFF</sub>	—	3.0	—	μs	R <sub>L</sub> =100 Ω, V <sub>CE</sub> =10 V, I <sub>C</sub> =2.0 mA

Figure 1. Forward voltage versus forward current

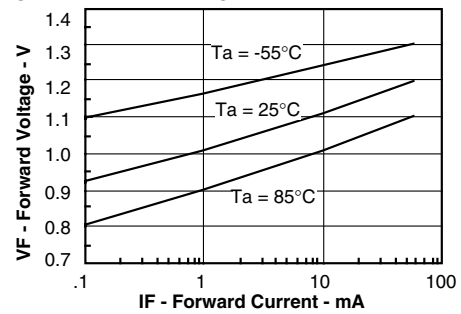


Figure 2. Normalized non-saturated and saturated CTR at T<sub>A</sub>=25°C versus LED current

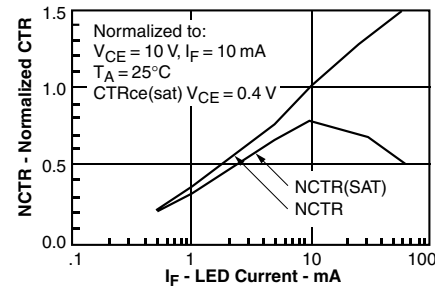


Figure 3. Normalized non-saturated and saturated CTR at T<sub>A</sub>=50°C versus LED current

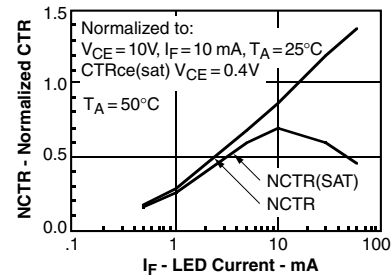
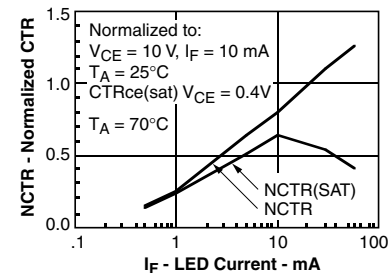
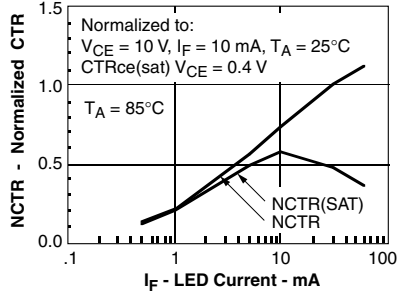


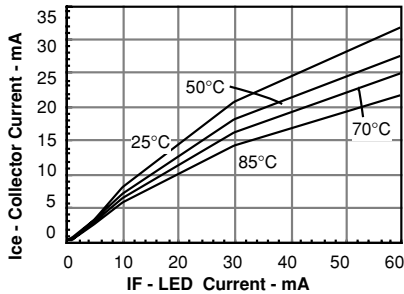
Figure 4. Normalized non-saturated and saturated CTR at T<sub>A</sub>=70°C versus LED current



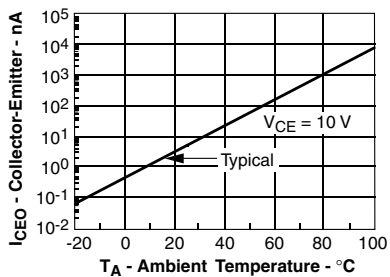
**Figure 5. Normalized non-saturated and saturated CTR at  $T_A=85^\circ\text{C}$  versus LED current**



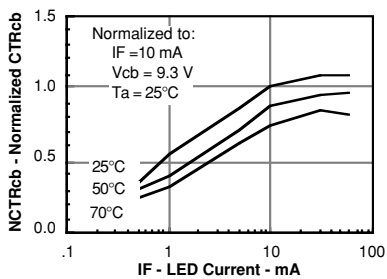
**Figure 6. Collector-emitter current versus temperature and LED current**



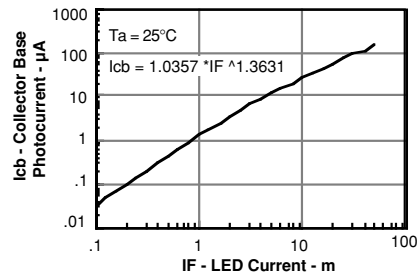
**Figure 7. Collector-emitter leakage current versus temperature**



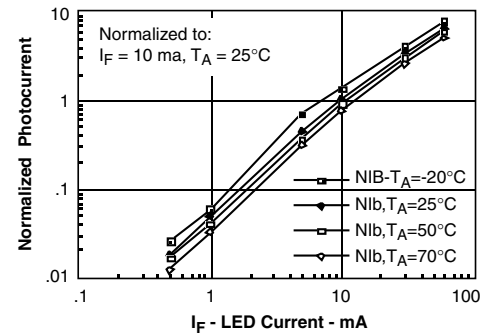
**Figure 8. Normalized CTR<sub>cb</sub> versus LED current and temperature**



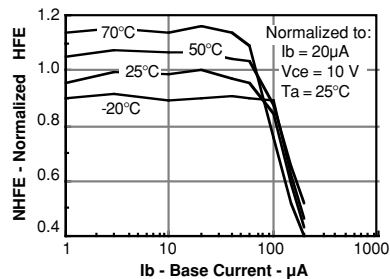
**Figure 9. Collector base photocurrent versus LED current**



**Figure 10. Normalized photocurrent versus  $I_F$  and temperature**



**Figure 11. Normalized non-saturated HFE versus base current and temperature**



**Figure 12. Normalized saturated HFE versus base current and temperature**

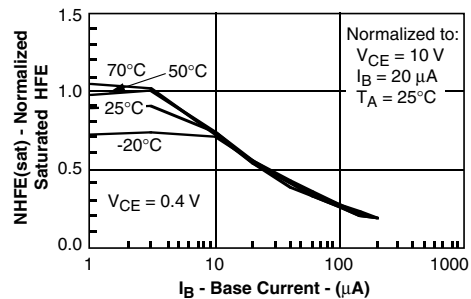


Figure 13. Propagation delay versus collector load resistor

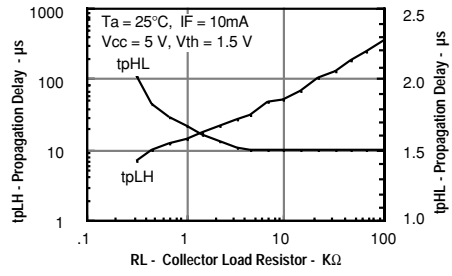


Figure 14. Propagation delay versus collector load resistor

